SD11
A584
#114

Forest Research Notes

Northeastern Forest Experiment Station

FOREST SERVICE, U.S. DEPT. OF AGRICULTURE, 102 MOTORS AVENUE, UPPER DARBY, PA.

No. 114
1961

# THE VIRGINIA PINE SAWFLY IN 1960 --A SPECIAL COOPERATIVE REPORT

An outbreak of the pine sawfly, Neodiprion pratti pratti (Dyar), has existed in Maryland since 1955. By 1959 the insect had spread throughout 14 million acres in the Coastal Plain and Piedmont of Virginia and into several North Carolina counties. Because egg surveys conducted in the spring of 1960 indicated a continuation of the epidemic, an aerial survey was conducted to further evaluate the situation. This report contains a summary of this latter investigation.

The aerial survey was conducted with funds and personnel contributed by the following organizations: Beltsville Forest Insect Laboratory, U. S. Forest Service; Maryland Department of Forests and Parks; North Carolina Forest Service; Northeastern Forest Experiment Station, U.S. Forest Service; Southeastern Forest Experiment Station, U.S. Forest Service; and Virginia Division of Forestry.

## Procedure

The method used was an aerial strip survey along predetermined flight lines. County highway maps at a scale of 1 inch = 2 miles were used for base maps. Observers recorded conditions along 5-chain strips on both sides of the airplane, using the operation recorder system, which has proved successful for many years on similar surveys. Flight lines were spaced at 10-mile intervals, although the maps were

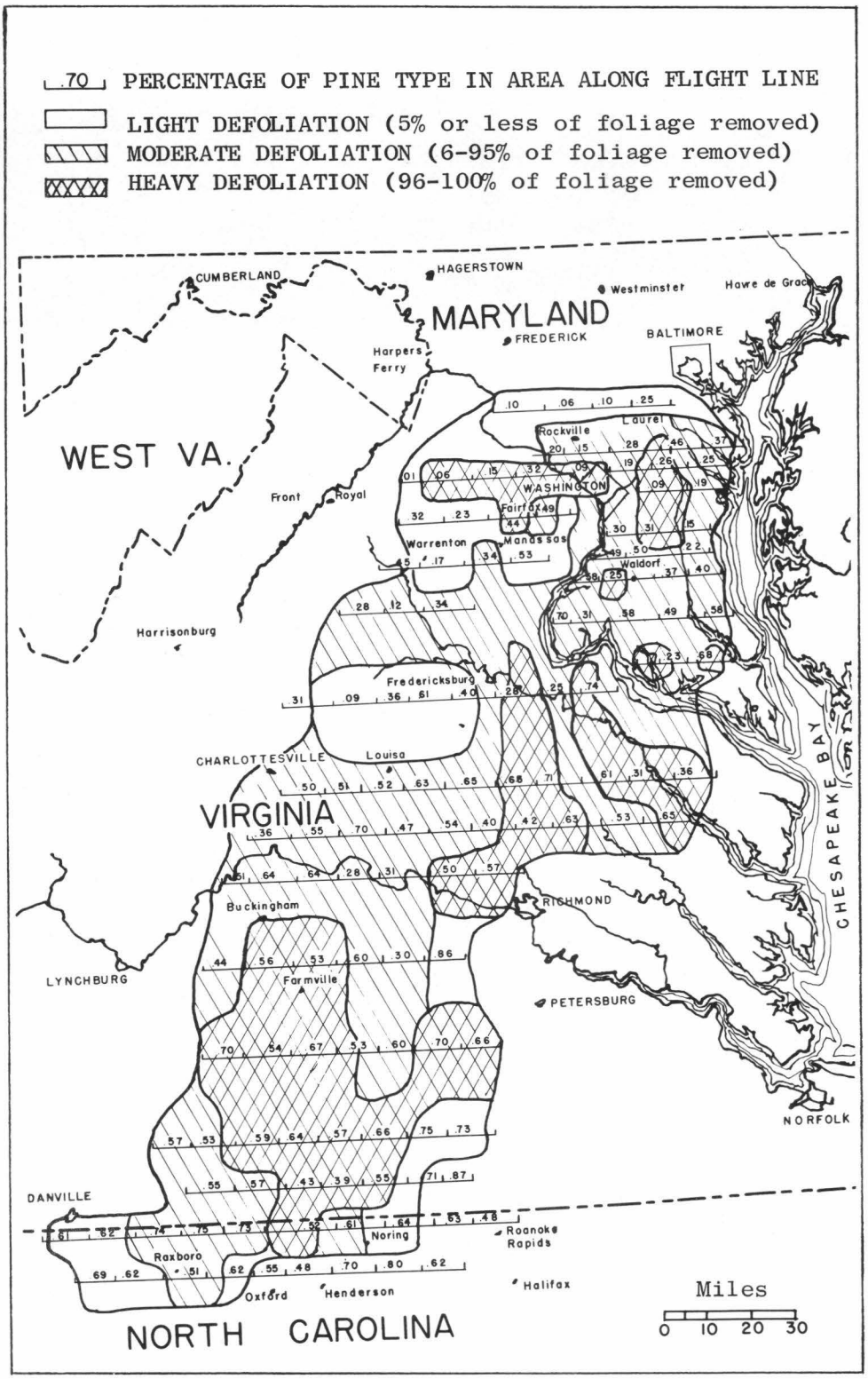
.70 PERCENTAGE OF PINE TYPE IN AREA ALONG FLIGHT LINE
LIGHT DEFOLIATION (5% or less of foliage removed)
MODERATE DEFOLIATION (6-95% of foliage removed)
HEAVY DEFOLIATION (96-100% of foliage removed)
CUMBERLAND
HAGERSTOWN
MARYLAND
Westminster
Havre de Grace
FREDERICK
BALTIMORE
Harpers Ferry
WEST VA.
Rockville
Laurel
WASHINGTON
Front Royal
Fairfax
Manassas
Warrenton
Waldorf
Harrisonburg
Fredericksburg
CHARLOTTESVILLE
Louisa
VIRGINIA
CHESAPEAKE BAY
Buckingham
RICHMOND
LYNCHBURG
Farmville
PETERSBURG
NORFOLK
DANVILLE
Roanoke Rapids
Norlina
Raxboro
Oxford
Henderson
Halifax
NORTH CAROLINA
Miles
0 10 20 30

Figure 1.--Pattern of defoliation by Virginia pine sawfly in Maryland, Virginia, and North Carolina. The map is based on an aerial survey made in 1960.

---

prepared to permit observations at 5-mile intervals where conditions varied or where additional data were required.

Fairly uniform damage was encountered over extensive areas; and, in several instances where defoliation was light, flight-line distances were increased to 20 miles. The locations of flight lines are shown in figure 1.

Three classes of defoliation were distinguished by the observers:

Light - 5 percent or less foliage removed.
Moderate - 6 to 95 percent foliage removed.
Heavy - 96 to 100 percent foliage removed.

Along the flight lines, pine stands showing no visible insect feeding were also recorded.

The survey was begun on May 20 in North Carolina and was completed on May 27 in northern Maryland. In total, 15.6 hours of flying time were required.

In mapping the area, the following timber type designations were used:

Pine - 50% or more of the stand in pine
Pine-hardwood - 25 to 50% of the stand in pine.
Hardwood - less than 25% of the stand in pine.

On the map, pine type is shown as a percentage of the land area observed in each 10-mile segment along the flight lines. For example, on the flight line above Roanoke Rapids, N. C. (bottom of map, in center), the number 48 indicates that 48 percent of the land area in that 10-mile segment had a forest cover of pine type.

Since the sawfly attacks pines just as severely in predominantly hardwood stands as it does in pine stands, the pine and pine-hardwood areas were combined in recording defoliation.

No effort was made to separate pine species in the type-mapping, even though it is recognized that loblolly pine is not a preferred host when Virginia pine, pitch pine, and shortleaf pine are available. Loblolly pine is a major component only in the forested areas along coastal Virginia and in southern Maryland.

## Discussion

Figure 1 shows the distribution and intensity of defoliation by N. pratti pratti during 1960 within the three states included in this survey. The development of the outbreak for the years 1955-60 is presented in figure 2. An acreage summary for this period is shown in table 1.

Although the total acreage infested in 1960 has decreased by approximately 4 million acres from that recorded in 1959, the decrease is limited almost entirely to the periphery of the epidemic area, where only light feeding had been noted previously. Much of this reduction in infested acreage was in southeastern Virginia, where loblolly pine is the predominant species and the preferred Virginia pine occurs only as scattered trees. Egg surveys had shown that the sawfly was present in the peninsulas between the Potomac, Rappahannock, and York Rivers; but the flight lines were terminated as shown in these coastal areas because of the sparseness of Virginia pine.

This was the first year that an aerial survey was conducted over the entire outbreak area, and thus the limits of these forest types were better defined. Throughout the interior of the defoliated area, feeding injury has intensified and zones of heavy defoliation have doubled. For example, the areas of heavy defoliation have increased from $1\frac{1}{2}$ million acres in 1959 to 3 million acres in 1960.

The aerial survey not only gives an accurate overall picture of damage to the susceptible pines, but also directs the entomologist to the areas where he can intensify his egg

Figure 2.--The trend of defoliation damage by the Virginia pine sawfly in Maryland, Virginia, and North Carolina, 1955-60.

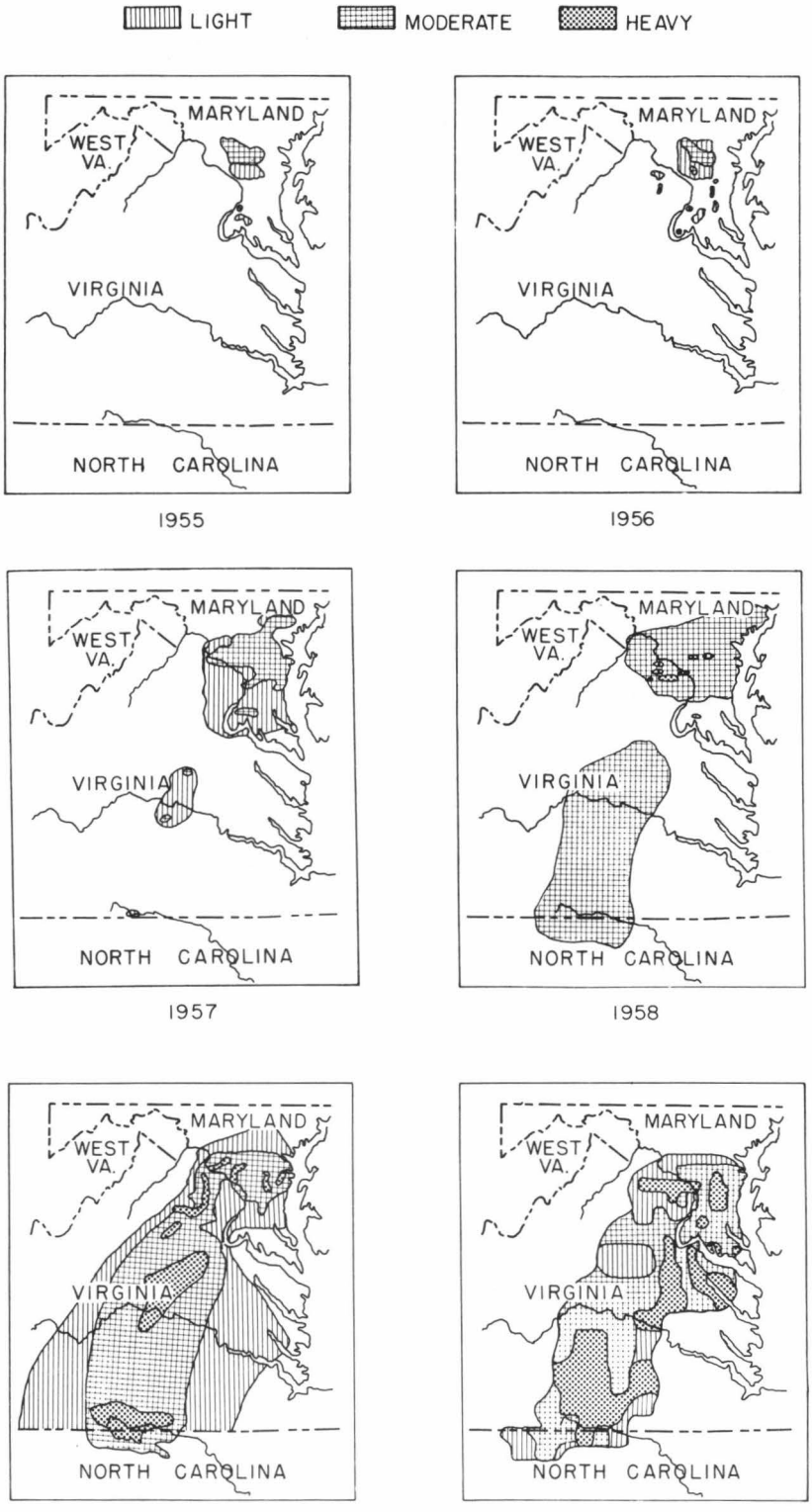
LIGHT
MODERATE
HEAVY
MARYLAND
WEST VA.
VIRGINIA
NORTH CAROLINA
1955
1956
1957
1958
1959
1960

Table 1.--Virginia pine sawfly defoliation, 1955-60

(In thousands of acres)

| Year | Light | | | Moderate | | | Heavy | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | Maryland | Virginia | North Carolina | Maryland | Virginia | North Carolina | Maryland | Virginia | North Carolina | |
| | | | | | GROSS ACREAGE[1] | | | | | |
| 1955 | 156 | -- | -- | 170 | -- | -- | -- | -- | -- | 326 |
| 1956 | 258 | 40 | -- | 86 | -- | -- | -- | -- | -- | 384 |
| 1957 | 921 | 1,372 | -- | 929 | 69 | -- | -- | -- | -- | 3,291 |
| 1958 | -- | -- | -- | 2,625 | 4,473 | 652 | 100 | -- | -- | 7,850 |
| 1959 | 642 | 5,835 | -- | 817 | 5,141 | 365 | 142 | 1,341 | 48 | 14,331 |
| 1960 | 252 | 1,404 | 331 | 975 | 3,487 | 298 | 262 | 2,750 | 58 | 9,817 |
| | | | | | NET ACREAGE[2] | | | | | |
| 1955 | 15 | -- | -- | 14 | -- | -- | -- | -- | -- | 29 |
| 1956 | 19 | 4 | -- | 9 | -- | -- | -- | -- | -- | 32 |
| 1957 | 129 | 262 | -- | 130 | 13 | -- | -- | -- | -- | 534 |
| 1958 | -- | -- | -- | 315 | 1,131 | 13 | 12 | -- | -- | 1,471 |
| 1959 | 77 | 1,476 | -- | 98 | 1,301 | 31 | 17 | 339 | 11 | 3,350 |
| 1960 | 32 | 355 | 84 | 360 | 882 | 75 | 72 | 696 | 15 | 2,571 |

[1] Includes all forest types and land areas where defoliation was recorded.

[2] Based on percentage of pine type and pine-hardwood type, from aerial survey or Forest Service inventory records.

surveys and biological appraisals. Thus he can bolster his prediction of what the sawfly can be expected to do in 1961 and what areas need particular attention. One additional benefit arises when figure 2 is reviewed; here the accrued defoliation of past years can be determined at a glance and a more intelligent decision can be made as to the effect that continued heavy defoliation may have on stand vigor and growth loss.

--T. McINTYRE[1]
R. C. HELLER
C. L. MORRIS

---

[1]Mr. McIntyre is Entomologist, Laurel Research Center, Northeastern Forest Experiment Station, Forest Service, U.S. Department of Agriculture, Laurel, Md.

Mr. Heller is Research Forester, Beltsville Forest Insect Laboratory, Forest Service, U. S. Department of Agriculture, Beltsville, Md.

Mr. Morris is Chief, Forest Insect and Disease Investigations, Virginia Division of Forestry, Charlottesville, Va.